CLAIMS:

1. A displacement device with a first part (1) and a second part (2) which are displaceable relative to one another in at least an X-direction and a Y-direction perpendicular thereto, wherein the first part comprises a carrier (5) which extends substantially parallel to the X-direction and the Y-direction and on which a system (3) of magnets is fastened in a pattern of rows (7) extending parallel to the X-direction and columns (8) extending parallel to the Y-direction, wherein an equal distance is present each time between the rows and between the columns, wherein in each row (7) and in each column (8) magnets of a first kind (N) with a magnetization direction perpendicular to the carrier (5) and directed to the second part (2) and magnets of a second kind (Z) with a magnetization direction perpendicular to the carrier (5) and directed away from the second part (2) are positioned in alternation, and wherein a magnet of a third kind (H) with a magnetization direction directed from a magnet of the second kind (Z) to the magnet of the first kind (N) is arranged between the magnets of the first (N) and the second kind (Z), while the second part (2) is provided with a system (4) of electric coils with at least one electric coil of a first kind (C1), with current conductors (9) situated in a magnetic field of the system of magnets and enclosing an angle of substantially 45° with the X-direction, and with at least one electric coil of a second kind (C2), also with current conductors (10) situated in the magnetic field of the system of magnets and enclosing an angle of substantially 45° with the X-direction but directed perpendicular to the current conductors (9) of the first electric coil (C1), characterized in that the displacement device is provided with a number of sensors sensitive to magnetic fields, which sensors supply a signal which is dependent on the local mutual positions of the permanent magnets of the first part relative to the electric coils of the second part in the region where these two parts overlap.

2. A displacement device as claimed in claim 1, characterized in that the sensors sensitive to magnetic fields are present in that part of said two parts in which the coil systems are situated.

3. A displacement device as claimed in claim 1 or 2, characterized in that the sensors sensitive to magnetic fields comprise Hall sensors.

4. A displacement device as claimed in claim 3, characterized in that the sensors sensitive to magnetic fields comprise one or several linear arrays of individual Hall sensors which are situated at regular distances to one another.

5. A displacement device as claimed in claim 4, characterized in that

- the magnets of the first (N) and the second kind (Z) are of an identical square shape with sides (13), and the magnets of the third kind (H) have an oblong shape with sides (12, 14), the longer sides (12) of a magnet of the third kind (H) adjoining the sides (13) of a magnet of the first (N) and the second kind (Z) and being equally long as the sides (13) of the magnets of the first and second kinds, while the ratio of the length of the shorter side (14) of a magnet of the third kind (H) to the length of the longer side (12) lies between 0.25 and 0.59, and
- the distance between the centers of the outermost Hall sensors of a linear array is equal to $2n \times p$, with $n \in \{1, 2, 3, ...\}$, and p is the pole pitch of poles of equal orientation of the permanent magnets in a diagonal direction in the XY-plane at an angle of –45° or +45° to the X-direction and the Y-direction.

6. A displacement device as claimed in claim 5, characterized in that the linear arrays present at least comprise a first linear array in a first diagonal direction and a second linear array in a second diagonal direction perpendicular to the first.

7. A displacement device as claimed in claim 6, characterized in that the first linear array belongs to a system of two arrays of the same orientation situated next to one another at a mutual distance of $1/2p + n \times p$, and the second linear array belongs to a system of two arrays of equal orientation situated next to one another at a mutual distance of $1/2p + n \times p$, with $n \in \{1, 2, 3, ...\}$.

8. A displacement device as claimed in claim 7, characterized in that a third system of linear arrays is present at a distance from and in the extended direction of one of said two other arrays.

9. A displacement device as claimed in claim 7, characterized in that the vertical distance between the first and the second part can be determined from amplitudes of signals of the sensors of two arrays which belong to one another.

10. A displacement device as claimed in claim 4, characterized in that

- the electric coils are of an approximately rectangular shape and as a result have mutually opposed parallel straight sides,
- the electric coils of each coil system are arranged such that their corresponding sides are positioned parallel to one another, and
- each linear array is arranged in a position parallel to a side of the immediately adjacent electric coil and at equal distances to the ends of said side.

11. A displacement device as claimed in claim 4, characterized in that the individual Hall sensors of each array are connected to an input of a summation amplifier via respective individual differential amplifiers.